DECEMBER 14, 2006 WINDSTORM AFTER-ACTION REPORT

February 23, 2007

With the help of members of the City's Disaster Management Committee, the Seattle Office of Emergency Management has prepared this report to document the impacts, departmental actions, and key lessons learned from the December 14, 2006 Windstorm.

To: Mayor Nickels
From: Barb Graff, Office of Emergency Management Director
Subject: December 2006 Storm After Action Report

With the help of key members of the City's Disaster Management Committee (DMC), the Office of Emergency Management has prepared this After Action Report to review the impacts, actions, and key lessons associated with the December 2006 rain and windstorm.

This historic storm eclipsed the impacts of many past disasters here in the city. Unusually intense levels of rainfall in a very short period of time were immediately followed by very heavy winds that felled power poles, and large, mature, healthy trees, not just diseased trees at risk. Although an inch of rain had been predicted for a 24-hour period, instead three-fourths of an inch fell in less than 45 minutes in some areas of the city. As a result, more than 1.5 million customers were without power throughout western Washington and Oregon – some for longer than a week. Similar storm systems moved through other parts of the nation that week, killing more than 60 people in 11 states. We are saddened that one of those casualties was here in Seattle.

It has long been the practice of the City to analyze its response following both real events and exercises to help identify areas for improving our response, recovery, mitigation and preparedness programs. This report serves that purpose and the lessons will be incorporated into the DMC's work plans. It is important to note three points:

1) The City was already working diligently on improving disaster response capabilities when the storm hit. For example, because of the shortage of Red Cross volunteers, Parks Department staff is being trained to operate emergency shelters; and our department operating centers such as SPD's and SDOT's, work in close coordination to optimize our response efforts. We are committed to the continuous improvement of our response and will institutionalize the lessons learned from this storm.
2) This event underscored the vital importance of the basic message we have delivered since the early '90s – the need to be personally prepared and self sufficient in anticipation of emergencies that can overload emergency response systems and compromise basic services.
3) Dedicated and energetic staff members put into place, "on the fly," new response strategies. For instance, Public Health set up and managed one

centrally located shelter facility for residents with special medical or assisted living needs from throughout the county.

There is a natural tendency to look at this recent disaster response and ask what it teaches us about our response to more severe events, such as an earthquake. Many of the lessons about coping with power outages and the need to coordinate and more broadly disseminate information are certainly quite applicable. But we must also apply lessons from the transportation system-crippling snow and ice of the following weeks, as well as communication system vulnerabilities and other broader structural damage impacts to fully appreciate how much more work must be done to strengthen our community's resilience in the face of disaster.

I would like to especially acknowledge Steve Marten of the Office of Emergency Management for his tireless efforts in coordinating the production of this report. In addition I want to acknowledge and thank the following individuals from the DMC and Police Command staff who also contributed to this report.

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Karl Stickel, Department of Finance
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December 2006 Storm Overview

A historic and powerful Pacific storm swept across the Northwest in mid-December 2006, causing extensive wind damage and bearing another round of extensive precipitation. While December 14 started off relatively mildly, by late in the day the storm took a rapid turn for the worse, with winds ultimately gusting to 60 mph. During the 24-hour period from midnight on December 14 to midnight on December 15, the Weather Forecast Office at Sand Point recorded 2.17 inches of rain, with more than half that amount falling before 4 p.m. on December 14. The effects of the storm spread inland as far east as the northern Rockies and southward into central California. Making the situation worse, a late-afternoon Seahawk game in Seattle meant many more motorists attending the game were further delayed from getting home because of the tempest. By December 15, the rain in Seattle had dissipated somewhat, but wind gusts of 69 mph were still recorded.

The record intensity storm of torrential rains and high-velocity winds took a toll on Seattle's residents and their property. In addition, the storm caused great damage to City property and infrastructure, with preliminary damage estimates at $16 million. Ultimately, the governor declared a state of emergency in a number of counties (including King County), and mobilized the National Guard to assist in storm response and recovery operations.

Selected Storm Impacts on the City:

- Tragically, one woman was killed when she was trapped in a flooded basement in her home.
- Scores of city residents experienced thousands of dollars in damage to their homes and businesses from downed trees falling onto house roofs and cars, flooding inside homes and businesses, severe roof and siding damage from the withering winds, etc.
- City Light suffered its most extensive outages in the utility's history, with more than 49 percent of customers losing power.
- 178 traffic signals and signs were damaged or tangled and 150 traffic signals went dark.
- Sections of dozens of major arterials and hundreds of neighborhood streets were blocked, mostly by fallen trees.
- An estimated 700 trees fell on public property.
- Calls to Police, Fire, SPU, SDOT and City Light spiked dramatically during the storm and for days afterward. The Citizens Service Bureau similarly experienced a substantial increase in calls, particularly on December 15 (Friday) and 18 (Monday), with an average 130 more calls-per-day than for the comparable dates in 2005.
- For about 20 minutes the Ballard Bridge was stuck in the "up" position. While this condition was not caused by the storm, it contributed to traffic challenges and required the immediate attention of bridge maintenance crews.

- Falling, wind-driven construction equipment from a downtown building led to the closure of a square block area surrounding the structure.
- Six landslides of various sizes were reported to SPU on the morning of December 15, as well as flooding to 300 homes throughout the city.
- The 520 Bridge was closed for a time due to high winds.

Key City Actions Taken:

- At the peak of demand City Light mobilized 40 line and service crews and 10 private tree crews to begin restoration work as soon as conditions allowed. Three-hundred Seattle City Light employees, including some who voluntarily curtailed vacations, worked in extended shifts (although there was a maximum limit imposed to assure crew safety was not compromised) to provide around-the-clock response. They were augmented by mutual aid crews from PacfiCorp, Benton County PUD and Snohomish County PUD. All told, more than 58,000 people-hours were expended during an eight-day period to respond to more than 36,000 calls received by the SPU Call Center.

  City Light Power Outage and Restoration

Day	Time	Customer Accounts w/o power	% Restored
12/15	4 a.m.	175,000	
12/15	11 p.m.	82,500	78%
12/16	11 p.m.	32,500	86%
12/17	11 p.m.	18,750	95%
12/18	11 p.m.	15,000	96%
12/19	11 pm.	9,000	98%
12/20	11 p.m.	5,300	98.9%
12/21	11 p.m.	less than 1,000	99.7%

- SPU mobilized 20 crews on 16-hour shifts to address flooding, with crews staged in areas of past flooding problems. SPU responded to 585 work orders in a two-day period, 400 of which were generated between 4:30 and 6 p.m. on December 14.
- Emergency Management initiated a limited activation of the Emergency Operation Center (EOC) on December 14 to help coordinate response among critical departments, maintained that contact with departments via the Staff Duty Officer throughout the weekend, and reconvened EOC staff Monday morning.
- Parks Department opened and staffed emergency shelters that served 232 clients.
- Public Health - Seattle & King County contacted all hospitals and nursing homes in the city several times over a period of seven days ensuring that their needs were met.
- Public Health - Seattle and King County, supported by the Department of Neighborhoods and the Human Services Department, provided information

about carbon monoxide and food poisoning prevention via their field inspectors at shelters, stores that sold barbeques and generators, community organizations, local nonprofit human service organizations and to ethnic media outlets (in several languages).

- Public Health-Seattle and King County activated and operated a special needs shelter over a period of four days for individuals with special medical needs and distributed information on carbon monoxide and food poisoning prevention to populations with limited English proficiency.
- SDOT pre-programmed and pre-positioned changeable message signs at nearby locations in anticipation of the Washington State Department of Transportation closing the 520 Bridge because of winds in excess of 40 mph.
- From a normal staffing level of 16, SDOT brought in additional crews (maximum of 70 men and women) to clear streets of trees, high water and storm debris, and to assist other City departments as needed.

Purpose of the After Action Report:

Incidents such as this storm provide an opportunity to test many elements of City emergency planning, training and preparation. Overall, City departments and personnel performed exceptionally well under trying conditions. Nevertheless, there are lessons to be learned.

Among those lessons are:

- It is critical to “get ahead” of an impending emergency whenever possible. Certainly, broadcast of public information messages “early on” might have helped better prepare city residents for the onslaught.
- Proactive safety messages prepared in the many locally spoken languages beyond English might have been helpful.
- Coordination is the key to success in any emergency, and gathering department representatives at the EOC, in addition to the EOC staff, may have aided in the response.
- The limitations inherent in the size of City staff and equipment to handle demands of this magnitude should prompt examination of long-term investment priorities.
- We were also reminded that financial support for social services and coordination with the private sector is essential in dealing with this kind of emergency.

The above lessons are examples of the healthy self-examination vital to making an After-Action Report (AAR) truly valuable. If we make an honest and bias-free examination of our own performance as a City, we stand an excellent chance of improving our response in the future. It is in this spirit that we undertake this AAR.

The next section deals with recent City preparedness efforts, followed by a summary of the key practices that worked well, and finally followed by a section

highlighting those areas needing additional work and improvement to make future responses to a major incident more effective. More definitive information is contained in the latter sections of this AAR, which were compiled and contributed by the City's Emergency Support Functions (ESFs).

An outside consultant will provide additional feedback following a more extensive review and assessment of Seattle City Light's storm response actions. This independent analysis is expected to be completed by the end of April 2007.

Recent Preparedness Efforts for Dealing with Major Flooding and Major Power Outages:

The City of Seattle conducted two tabletop exercises in the fall of 2004 to evaluate the readiness primarily of SPU and SCL to respond to major incidents and disasters affecting the City's power and water systems. The tabletop exercises also evaluated the readiness of other City departments and critical support agencies and partners. Partial grant funding from the Department of Homeland Security enabled SPU and SCL to hire a consultant who designed, facilitated, and evaluated both exercises. Essentially, the objectives of both exercises were to: evaluate policy issues, evaluate coordination between key players, identify high priority areas of impact, evaluate senior leadership protocols, exercise communications linkages and evaluate the City's Joint Information Center.

The SPU exercise featured a water system failure predicated on the loss of pressure and the subsequent flooding of components of the in-city distribution system. Besides the loss of water for fire service, drinking water and sanitation, the exercise reviewed issues surrounding surface water flooding of residences, highways and businesses. The scope of the exercise scenario exceeded the challenges faced by SPU during the recent December 2006 windstorm, but highlighted some of the same issues, including: damage assessment to facilities, claims by impacted citizens, communications with staff, and shortfalls in equipment and resources necessary to respond to complicated water and drainage issues.

The SCL tabletop exercise scenario assumed a regional power outage caused by a terrorism event affecting the "bulk electrical system." The simulation revolved around an attack that caused significant damage to a major BPA switching substation that, in turn, resulted in cascading outages in the Puget Sound region. The time of year simulated in the exercise was winter with below freezing temperatures and snow falling.

Because the Northwest Power Pool (NWPP) restoration plan calls for SCL to build a generation/load island and when stable, synchronize and connect its system to neighboring systems (i.e., BPA and PSE), the scenario had a broad impact across the region.

The SCL “size-up” (initial assessment of the problem), shared with the other City departments, revealed that without the City’s interconnected power systems intact, SCL would be hard pressed to maintain one-third of its normal customer load during that time of year. Given this situation, SCL’s response strategy was to use the Skagit generation plant to build a “load island” in the northern part of the distribution system, thereby stabilizing generation and then systematically shedding that load and picking up 'critical load' facilities, such as the First Hill Network and other Life Safety facilities as best able.

Lessons learned the during table top exercise didn't have much effect on the response to the December 2006 Windstorm. The windstorm was essentially a distribution system catastrophe, whereas the tabletop exercise was primarily a transmission and generation system event. SCL did, however, simulate restoring power to shelter facilities during that exercise, and there were several coordinated efforts towards that same goal during the windstorm.

Key Practices that Worked well in Response to the Windstorm

- Both SDOT and SPU made extraordinary efforts to accommodate the public. SDOT removed privately owned trees from street rights-of-way; and SPU provided additional trash and debris removal, and direct aid to residents of Madison Valley, all at no charge to property owners. Throughout all City departments, employees consistently showed initiative and commitment to the public's well being by working extended hours, despite exposure to the weather and to safety hazards. Many of these employees had their own families and homes affected by the storm.
- The presence of an SPD liaison in the SDOT Department Operations Center was an adaptation from the Snow and Ice Plan, and provided direct coordination between SDOT and SPD's Seattle Police Operations Center (SPOC).
- The use of community centers and the ability of the Parks Department to quickly implement procedures established in the ESF-6 Annex to activate and staff shelters was a great success. Both the Seattle Fire and Police Departments were very helpful in providing residents with information about the location of shelters and conducting "emphasis patrols" and "welfare checks" to aid people on the street who were in distress.
- In the aftermath of the storm, departments such as SPU, SCL, SDOT, DPD and Parks worked with the Emergency Public Information Coordinator and the Mayor's Office to send out important safety information. Via news releases and media, the city was able to direct people on where to seek shelter, to stay away from downed power lines, and to not burn fires indoors to avoid CO poisoning, etc.
- Public Health - Seattle & King County, supported by the Department of Neighborhoods and the Human Services Department, provided information on carbon monoxide and food poisoning prevention to people via their field inspectors at shelters, to stores that sold barbeques and generators, to community organizations, to local nonprofit human service organizations and to ethnic media outlets (in several languages).
- SCL initiated a door-to-door outreach to customers without power, hand-delivering 20,000 information leaflets that were written in eight languages. The leaflets contained tips on staying safe and warm, and provided the current locations for City operated shelters.

Key Lessons Learned

- Key City officials should be more proactive in activating the EOC at a Phase 2 (Multi-departmental representation) in any event that is multi-departmental in scope and has the potential to grow into a major incident and last for an extended period.
- Ensure the City Council President (or acting president) receives regular updates from the Mayor or Mayor's staff, starting with the activation of the EOC and lasting until the emergency phase of operations has concluded. This will include distribution of EOC status summaries to all Council members.
- The City should be more proactive in getting public information out early through its Joint Information Center (JIC), and provide a consistent and coordinated flow of public messages and media releases during the emergency phase. That same flow must continue during the recovery phase, especially when people's lives and livelihoods are substantially affected and/or where substantial damage has occurred.
- The Emergency Resource Center (ERC) or a similar venue should be available to give the public one number to call to communicate with any City department, with the sole exception of emergency 9-1-1 calls.
- In any situation where the public is experiencing a major inconvenience or direct threat, it is very important for the City to be perceived as making itself both easily and readily available to deal with their issues. Having multiple numbers for varied types of services or information is not only confusing, but makes the City look too bureaucratic. The original idea of the ERC was to staff it with employees from all necessary departments, so that citizens could call one number to get in immediate contact with an individual with the knowledge and access to fully address their inquiry and/or specific needs.
- The ERC was put in place during the winter storms of 1997, when the city experienced more than 100 landslides that generated a high volume of citizen calls to various City departments over an extended period. The ERC worked well in this instance, but there was a lack of follow-up on the part of the City to give it the emphasis and funding to permanently establish it as a "one-stop" call center. As the City re-examines solutions the addition of a 3-1-1 capability might be helpful.
- To be consistent with the City's Disaster Plan and other departments, SCL should formally establish a department operating center (DOC) staffed with senior managers to oversee the department's emergency responsibilities and coordinate with other DOCs and the City EOC.
- The City of Seattle should provide more training opportunities for personnel assigned to DOCs to practice coordinating with other DOCs in sharing and acting on information that affects multiple departments. During training of DOC personnel, emphasize the availability of the logistical services that can be provided by the Resource Support Operations Center (RSOC), or by the ESF-7 Logistics Section in the EOC.

- SCL should develop a more robust emergency power restoration plan for storms similar to the SDOT Snow and Ice Plan. This plan should include provisions for mobilizing and staging emergency crews so they are able to respond as soon as it is safe, in addition to pursuing initiatives to expand SCL's mutual aid agreements with other power utilities and associations.
- SCL needs to acquire a system that can enable them to better identify specific customers without power, and be able to inform customers when they can expect to see their power restored.
- Seattle Fire Department needs to be able to equip all of their stations with emergency generators.

SEATTLE TRANSPORTATION DEPARTMENT (ESF-1)

Practices that Worked Well

- SDOT preparations and response were appropriate to the event. There was good pre-storm preparation as well as response during and following the wind and rainstorm. For the most part there was good coordination with SPD, SPU, and SCL. One issue did emerge with regard to tree removal, however. (See Lessons Learned below.)
- Pre-staging of Programmable Changeable Message Signs (PCMS) at strategic locations to advise motorists in the event of closure of SR-520 Bridge and other streets turned out to be very advantageous.
- Holding crews over into the evening to handle emergency response requirements and placing additional crews on "stand-by" for rapid response to emerging events worked well.
- In keeping with protocols developed in SDOT Snow & Ice Plan, SPD dispatched an officer to the Charles Street Department Operations Center to coordinate SDOT/SPD activities. This continued to work very well for both organizations.
- There was good coordination with WSDOT for communications of possible (likely) SR-520 closure and public messaging (to include messages and information dissemination strategies).

Interagency Coordination:

- Generally there was good interagency coordination, although coordination for tree removal did become an issue if the tree crossed wires. (See Lessons Learned below)
- It is understood that SCL's highest priority is to get the "feeder and lateral lines" back in service with the distribution system at the street level of a lower (and later) priority. However, SDOT tree crews cannot safely proceed with work until power crews have either removed live wires from trees or de-energized the wires. During the storm and immediate aftermath, however, SDOT was not able to ascertain whether SCL had already removed the wires and, therefore, whether they had a green light to proceed with the tree removal. On occasion, SDOT reported to a location multiple times.
- A highlight was the SDOT/SPD coordination, facilitated by the presence of an SPD representative in the SDOT Operations Center.

Lessons Learned

- Additional PCMS may have been useful for the morning commute period to manage traffic away from SR-520 Bridge and to the I-5 and I-90 corridors.

- There needs to be a communication mechanism set up so that SDOT knows when SCL has removed wires from downed trees and it's safe for SDOT crews to proceed with tree removal from the roadways.
- Successful use of WebEOC points out the value of training additional SDOT personnel in its use.
- SDOT could improve operations by upgrading the department's Geographical Information System (GIS) capability to better map problem locations.
- Installation of "Vehicle Locator" devices in SDOT vehicles will permit emergency managers to match incidents to real-time dispatching and location of crews. This will enhance rapid and efficient deployment of SDOT resources in dynamic and changing conditions.
- Need to acquire and have on hand a supply of "Water Over-the-Roadway" signs. (Note: This has been accomplished and signs are now on-hand at the SDOT Traffic Shop.)

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for SDOT

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
SDOT ESF-1	Response efficiency	Utilize GIS and/or GPS to track locations of crews and damage	Dave Schneidler	tbd	$60,000 for prototype	Grant
SDOT ESF-1	Emergency traffic management	Acquire six (6) additional Programmable Changeable Message Signs (PCMS)	Dave Schneidler	tbd	$102,000 for six (6) units	Grant
SDOT ESF-1	Emergency management	Increase number of SDOT personnel trained in use of WebEOC	Dave Schneidler	6/07	N/A	Include in SDOT training curriculum
SDOT ESF-1	SDOT does not have “Water Over Roadway” signs	Acquire appropriate inventory of “Water Over Roadway” signs for deployment in storm events	Paul Roberts (Mgr. Traffic Shop)	completed	$700	From SDOT operating budget

COMMUNICATIONS
(Department of Information Technology)
(ESF-2)

Overall Assessment

City government communications networks (radio, telephone, data communications, and e-mail/messaging) were almost completely operational during the event. Call volumes for radio and telephone were about twice the normal daily load immediately after the storm.

Practices that Worked Well

- On Friday, December 15, the City's public safety radio network carried 148,503 push-to-talks, compared to a normal day of 60,000 to 80,000 push-to-talks. The system was "busy" 464 times. (This radio network is used by Police, Fire, Public Utilities and others).
- During the windstorm week, the City received more than 51,000 telephone calls each day from outside City government. On a normal day, the City receives about 26,000 telephone calls. During the week of the November snowstorm, the average was more than 30,000 daily.
- Most of the call volume increase was attributable to the SPU/SCL Call Center (684-3000 and associated numbers). While this call center usually receives about 3,000 telephone calls each day, during the windstorm it received more than 18,000 daily calls.
- A number of City sites outside downtown lost power during the windstorm. City telephones and computer networks in those sites went down, but DoIT deployed portable generators to key sites to keep networks operational.
- The 24/7 City data center in the Seattle Municipal Tower operated normally throughout the storm period. In the early morning of Friday, December 15, there were eight electrical power fluctuations of 39 seconds or less. Power continued normally to the data center, however, because it is designed with multiple, redundant, and uninterruptible power supplies to smooth the flow of power to the computers housed there. If power had been lost, a 1.1 megawatt backup generator would have automatically started to take up the load.
- The Cable Office helped several cable customers during the power outage. Our understanding is that Comcast is automatically providing credits for lost service, while Millennium is providing them only for customers who call to complain. We are following up on this.

Lessons Learned

- City government has many different telephone numbers published for constituents to report incidents and service requests. We should investigate a single phone number for non-emergency calls, and possibly the addition of a 3-1-1 capability.

- One radio site was on emergency generator for 16 hours. This site, and one other, has propane-fueled backup generators. We found it very hard to refuel propane-fueled generators. We will consider replacing these generators with diesel-fueled models.
- The City's new community notification system ("outdialer") can be used for EOC call-ups and other employee mobilizations and notifications. We need to start a project to build and test this capability.
- Adding three additional channels to the City's Public Safety 800 MHz Radio system will greatly reduce the number of busy signals experienced by radio operators during subsequent emergencies.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for DoIT

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-2	Radio sites with propane fueled backup generators had issues refueling. Very hard to refuel propane generators during time of emergencies.	Replace the two generators located at remote radio site locations with diesel generators. Mapleleaf NE West Seattle (work with Sound Transit for	Jon Wiswell	12/07 12/09	$40,000 $60,000	Internal Fund Balance Sound Transit is funding.
ESF-2	Decrease busy signals for Public Safety 800 MHz Radio System	Acquire three more channels (simulcast) to add to existing radio system. This increases radio channels from 25 to 28 channels.	Jon Wiswell, and OIR Federal Liaison	12/08	$300,000	(not funded) OIR to make Federal Appropriations Request

SEATTLE PUBLIC UTILITIES
(ESF-3)

Practices that Worked Well

- The Operational Response Center (ORC) was able to identify and focus on the biggest problems.
- Having check-in meetings helped with maintaining continuity and being able to make adjustments as necessary.
- The provisions made for meals and lodging helped alleviate some of the anxiety experienced by residents that could no longer stay in their homes.
- Department-wide, people stepped up to the challenge.
- Good warning information facilitated the action plans developed to deal with the emerging situation.
- Radio communications, especially the special channel for Drainage and Wastewater, allowed crews and the ORC to communicate effectively.
- Effective and succinct communications contributed to the success of planning meetings.
- Crews from Water and Watershed Services assisted SPU drainage crews with response.
- The use of staff from Customer Services and Utility Systems Management branches in the field proved to be a valuable asset. It put staff in direct contact with the public at key locations, and allowed field conditions to be monitored while freeing up field crews for response to other dispatching requirements.
- Madison Valley response by SPU staff was rapid and comprehensive.

  Specific actions involved:

  - The SPU project engineer for the detention facility was on site during the storm and walked house to house to warn residents that the pond was flooding and to recommend they vacate their basements.
  - SPU provided on-site customer service by bringing a portable office to the site staffed with employees (including over the weekend) who helped residents accomplish a variety of things: obtain and complete city claims forms, arrange for temporary lodging, and provide general information about health and safety, cleanup, etc.
  - Throughout the week following the storm, SPU employees walked the neighborhood, going door-to-door with packets of information, and making “welfare checks” on residents.
  - Coordinated with other city agencies on behalf of residents to obtain information about when services would be restored (mainly City Light), and to advocate for speedy service in order to operate necessary electrical equipment to clean basements.
  - Arranged for cleaning companies to show up quickly.
  - Followed-up, by holding community meetings for residents shortly after the storm.

  Efforts are continuing to help affected residents.

Lessons Learned

- It would have been helpful if the EOC had activated at a higher level that included the participation of ESF-3. Such action would have made it easier for SPU to manage interdepartmental coordination. In some instances there were problems getting Department Operating Centers (DOCs) to provide SPU with timely support. EOC intervention could have relieved some of the higher-level strategic workload that taxed the staff available in the Water Operations Center (WOC). Such help could have matched SPU's priorities with other departments in getting other departments to help with tree-down issues, escorting crews through traffic, arranging for claims adjusters, and getting information out to the general public, etc. In addition, the EOC could also have provided a venue to give SPU the larger citywide picture of the storm's effects and to assist with analyzing emerging issues.
- More Incident Command System (ICS) training for SPU employees needs to be scheduled to give more depth for senior management staff and to train a broader group of mid- to front-line staff.
- SPU could improve their operations by integrating the department's Geographical Information System (GIS) capability within Planning and Operations functions, to be able to better map flooding locations and sites where crews were making repairs and mitigating damage in real time. It would be helpful for the department to develop better "real time" mapping GIS capabilities that can be quickly exported to the SPU DOC, other DOCs, and the EOC. The benefit of such products is the ability to spatially depict conditions, resource management, deployed resources, and incident impacts to aid senior decision makers.
- Develop a back-up staffing plan for the department.
- Establish a central location for briefing and dispatching inspectors.
- Radio traffic at times overwhelmed the existing channels. SPU should seek the help of DoIT to find a better and cost effective solution.
- In the future establish the ability to establish 24-hour staffing early on.
- The department would improve direction and control in the field if it could buy a Command Vehicle.
- Staffing fatigue became an issue over the duration of the incident.
- SDOT needs to be able to post "water over the roadway" signs.
- SPU requests for SCL assistance in the Madison Valley impact area needed better coordination.
- SPU tracking operations would be improved by having a real-time automatic vehicle locator (AVL) capability on field response vehicles in order to more closely track resource locations and balance workloads.
- SPU needs to assign more staffing for the ORC (Dispatching Unit), and to have these people trained ahead of time.
- Better communications capabilities for notification and direction and control are needed.

- Work with Fleets and Facilities to give priority repair to SPU vehicles that are necessary for emergency response.
- Some repair and restoration work was delayed because there is a need for more equipment for field crews to perform emergency work. SPU will study the efficacy of buying more emergency field equipment, and whether the expenditure can be justified in terms of using this equipment for normal operations, so it just doesn't sit idle awaiting the next emergency.
- The use of Water crews to assist Drainage crews would be enhanced if there was cached equipment available. For example, Water crews do not typically carry long enough hoses to attach to drainage pumps, which would enable them to drain water far enough away so that it doesn't interfere with their work sites.
- SPU, together with the other City departments, should renew discussions about establishing an Emergency Resource Center (ERC), or similar venue, that can be staffed by multiple departments in a major incident to provide citizens with a convenient, one-stop center that can give immediate assistance in answering questions and arranging for specific help. It may be possible to develop a 3-1-1 system to serve this purpose.
- The event highlighted some points about the infrastructure in the Madison Valley area, all of which SPU is actively pursuing.

  Specifically, these include:

  - The need for better documentation regarding older infrastructure.
  - The need to improve plan review and inspection to reduce non-standard infrastructure designs.
  - The need to improve the collection of stormwater (e.g., inlet and catch-basin upgrades), in addition to storage and conveyance improvements.

  Data gained from flow monitoring instruments associated with the detention pond project will aid SPU in determining the permanent/long-term project design to prevent a recurrence of the type of flooding Madison Valley experienced in this instance.
- Some inlets and catch basins were found to have filter fabric (i.e., filter socks) in place, even though the projects and construction that required them had been completed. More thorough monitoring needs to be done as part of the final phases of project completion or final permitting by the Department of Planning and Development (DPD).

  Note: In January 2007, DPD, working with SPU and SDOT, mailed notices to nearly 2,000 contractors and property owners with active permits involving ground disturbance. The letters reminded contractors and owners of their responsibilities, under City regulations, regarding storm drain "socks" or inserts. The socks are used for capturing silt from construction projects. The responsibilities specified in the letter were to: 1) clean the socks when they are half full, 2) inspect them when there has been 1/2 inch of rain in 24 hours, and 3) remove them within 30 days of site stabilization. DPD also reminded

them that if the socks are removed during flooding, they need to be replaced by the contractor afterward.

- Because the current DPD protocol is to respond only if there is a complaint, there appears to be a need to revisit the current protocol. Consideration should be given to enacting a more proactive method for enforcing applicable City regulations.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for SPU

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-3	Additional ICS Training for staff, specific to Pub Wks sector, and stressing planning skills	Increased and targeted ICS training for SPU staff, stressing Planning function	Ned Worcester	9/1/07	30,000	Operational
ESF-3	Need better integration of work-management, resource management and GIS for better real-time management and response	Develop applications and operational process to better integrate the applications and use the results operationally	Carrie Parker	18-24 months	$100,00	CIP Project, not yet approved
ESF-3	Do not have adequate field command post capability. Field	Purchase field command post trailer with adequate work-space and resources	Joe Mickelson	12-18 months	$100,000	CIP Unknown

	command is typically handled from crew pick-up truck					
ESF-3	Better tracking of field vehicles and equipment	Install AVL/GPS I all field response vehicles (~150)	Nick Pealy	12 months	initial cost $225,000 $30,000 annual costs	Annual O/M budget
ESF-3	Madison Valley long-term drainage solution	Alternative solutions are currently under review. Also, data gained from the current detention pond project will aid SPU in a goal of determining the appropriate permanent/long-term project design to prevent a recurrence of flooding in Madison Valley.	Linda Deboldt	Decision on approach on or before 12/31/2007 Project completion TBD	TBD – depends on the alternative approach utilized.	CIP
ESF-3	Need cached equipment at key sites to allow water crews to assist D/WW crews. Requires equipment not normally carried by water crews	Acquire specialized equipment for water crews, and cache in warehouse/critical sites in push-packs to allow rapid deployment to crews.	Joe Mickelson	9/30/2007	$300,000	Annual O/M budget or CPI project, not approved

SEATTLE FIRE DEPARTMENT
(ESF-4)

Overall Assessment

The Fire Alarm Center (FAC) was essentially overwhelmed with 9-1-1 calls and Fire Department resources were at times spread very thin, well below acceptable minimum coverage levels. Implementation of reduced response levels (sending fewer units than normal) helped maintain minimum coverage; however, call volumes tended to outpace resources. Non-emergency services that would normally be provided, such as water removal, were significantly curtailed given the sheer volume of calls.

Responding units often had to try several different response routes before finding ones that would provide access to emergency locations due to obstructions such as downed wires, trees and/or standing water.

Practices that Worked Well

Response units continued to receive emergency call notifications from the FAC and were able to respond in a consistently professional manner despite very trying and demanding conditions.

There were no significant injuries to firefighters as a result of this incident.

Lessons Learned

- Seventeen of the Department's 33 fire stations lost power initially, however, four of these (Stations 6, 13, 27 and 28) had pad mounted stand-by generators. This left 13 fire stations without electrical power as of 8 a.m., December 15, 2006. By 10 a.m. the same day, City Light restored power to two (16, 22) of the stations, leaving 11 stations without power into the afternoon of the 15th. Fire Station 8 received a large, trailer-mounted generator from DoIT to power the City's telephone switch in the station's basement. Electrical power was used from this generator to power two small heaters and several lights for the firefighters.
- SFD provided generators, fuel and food to various stations, as needed. While Support Services was delivering portable generators and heaters, Stations 21 and 40 regained power. This left eight fire stations (11, 20, 24, 33, 34, 36, 37 and 39) operating on small portable generators into the night of the 15th. These stations continued to utilize portable equipment until the last fire station (24) received electrical service at 8 a.m. on the 17th.
- Four stations suffered damage to the apparatus bay doors, which rendered them inoperable for a period of time. The apparatus vehicles were maintained outside of the stations so they would be available to respond.

- The welfare checks that were conducted using on-duty personnel and first line emergency apparatus placed an additional strain on SFD resources impacting their availability for emergency responses.
- The FAC received many requests to notify other City departments regarding situations found by Operations companies outside the scope of the Fire Department capabilities, i.e., wires down, blocked storm drains, water over the roadway. This is the type of information transfer that the EOC could have facilitated.
- Responding units were often faced with roads that were obstructed by downed power lines, standing water and/or trees. The EOC could have perhaps facilitated communication and coordination between SDOT, SCL and SFD in that regard. Additionally, had the EOC been activated it would have assured that the necessary interdepartmental coordination was taking place to enable SFD to give assistance to SDOT and SPU for the use of SFD chain saws, pumps, etc.
- Communication with the affected stations was a problem due to the loss of power and/or the fact that units were consistently out of quarters on alarms. It took several hours on the morning of the 15th to determine just how many stations were without power.
- Each fire station should be evaluated and, where lacking, be brought up to meet a realistic standard of 72-hour stand-alone capability, including, but not limited to:
    - Electrical generators (w/ fuel supply)
    - Potable water
    - Non-perishable food stores
    - Sanitation
    - Alternative to natural gas supply
- With regard to dispatching, earlier implementation of reduced response levels to maximize citywide coverage should be a priority. The “Move-up Module” of the Computer Aided Dispatch (CAD) system should be disabled or disregarded in situations such as this with extraordinarily high call volumes, again to help ensure citywide coverage. This module attempts to fill coverage voids across the City by automatically dispatching units to fill those voids.
- Other contingencies for conducting welfare checks of the approximately 200 persons on the SCL’s “special health issues” list such as use of neighborhood teams, Neighborhood District Coordinators, etc., need to developed to reduce the impact on SFD resources.
- Better communications regarding known areas where power and/or traffic signals are out or where streets are blocked due to downed lines, trees or standing water would help minimize response delays.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for Fire

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL(s) RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-4	Lack of adequate emergency power for all fire stations.	Work with Fleets and Facilities to develop a plan for providing all fire stations with adequately sized emergency generators and sufficient fuel to last for a minimum of 3 days.	SFD – Deputy Chief M. Walsh F&FD – Cory Davis	The plan to be completed by June 2007. Project completion TBD	To be determined by Fleets and Facilities.	To be determined by Fleets and Facilities.
ESF-4	Available resources depleted due to high call volumes.	Remind the FAC Dispatcher/Supervisors to implement "reduced response level" dispatching earlier during these types of events.	Deputy Chief Rosenthal	In progress	No cost	N/A
ESF-4	Units were being moved outside of their normal response district to fill voids left by high call volumes	Remind the FAC Dispatcher/Supervisors to disregard/disable automatic "Move-Up Module" of Computer Aided Dispatch system to keep units within their primary response district	Deputy Chief Rosenthal	In progress	No cost	N/A
ESF-4	Call volumes overwhelmed on-duty	Up-staff FAC sooner through off-shift calling of dispatchers.	Deputy Chief Rosenthal	In progress	Overtime at a minimum of 4-hours;	Normal operating budget

	dispatchers.				approx. $250 per person per event.	

EMERGENCY MANAGEMENT
(ESF-5)

Overall Assessment

Emergency Management staff facilitated interdepartmental coordination based on information available, and was able to help departments acquire needed information and requested resources in a timely manner. The activation provided newly hired staff the opportunity to gain real event experience in operating the EOC.

Practices that Worked Well

- EOC organization and procedures.
  - Staff teamwork.
  - Opportunity to train new staff.
  - Forecasting information from the National Weather Service was readily available, and easy to use.

Lessons Learned

- More training needs to be made available to DOC personnel to reemphasize those interdepartmental coordination procedures outlined in the City Disaster Plan.
- Department DOC and EOC responders need to be strongly encouraged by their department heads to attend the WebEOC training offered by OEM.
- The foregoing training regimen should also include a module by ESF-7 (Resource Management) managers, to explain the ready steps for acquiring critical resources and services determined by the DOCs to be either beyond the departments' means or purview to obtain, or that could more effectively be referred to ESF-7 because the DOC staff is being stressed with other critical and competing requirements.
- Encourage those officials authorized in the City Disaster Plan to be more proactive in evaluating when it would be most beneficial to their operations to request activation of the EOC at a Phase 2 (multi-departmental representation), especially any event that is multi-departmental in scope and has the potential to grow into a major incident. Such intervention would have facilitated the sharing of an ongoing strategic picture of the full scope of citywide operations and emergent issues, and provided the means -- when necessary -- to help departments reprioritize response efforts to deal with the most critical issues as well as synchronize response to sites where the resources of multiple departments were necessary.
- Some of the sections in the EOC Call-out List were out of date, and need to be coordinated with departments to obtain current information.
- Once activated, the EOC should have maintained operations at least through the weekend.

- OEM should take the initiative in working with the Mayor's Office and the Council, as well as the DMC, to determine the best way to help ensure that Council members are kept informed about citywide efforts to manage any serious emergency -- especially one that results in the activation of the EOC.
- This event demonstrated, once again, how important it is to educate and train citizens and their families to be able to provide for their basic needs for at least 72 hours after a disruptive or damaging incident. With the help of the Mayor's Office and the City Council, OEM has been able to hire two new community preparedness educators; and while the number of presentations to both the public and City employees has increased, there also needs to be an accountability mechanism set in place that can determine if and what those who are attending the presentations are actually doing to be ready for any type of emergency.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for OEM

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-5	More training for DOC personnel to get them proficient in performing emergency management responsibilities when the EOC is activated. This includes sections devoted to the use of WebEOC, and resource management.	Develop Lesson Plan. Develop Student Guide. Schedule and announce training. Deliver training. Make this a recurring training opportunity. Develop, schedule and deliver a refresher component.	Strategic Advisor II for Training and Exercising, assisted by the Strategic Advisor II for Operations and Plans and the IT Professional B	Sep 07	0	Existing Budget
ESF-5	Elected and senior management officials need to receive annual training that describes how the EOC works and their	This training has recently been accomplished for 2007 (on Jan 31), and will be scheduled annually,	OEM Director		0	Existing Budget

	respective responsibilities vis-à-vis the EOC.	or more frequently at the request of the Mayor's Office or the Council.				
ESF-5	Facilitate agreement between the Mayor and the Council on how the Council will be kept informed of the City's response and recovery efforts during an activation of the EOC.	Verbal agreement has been reached, which now needs to be incorporated into the Seattle Disaster Readiness and Response Plan.	Mayor's Office, City Council, OEM Director and Strategic Advisor II for Ops and Plans	Mar 07	0	Existing Budget
ESF-5	Currently there is no accountability mechanism in place to determine the actions citizens and City employees are taking to be better prepared once they receive personal and family preparedness training.	Determine and implement methodology that can acquire this type of information on a regular basis. Such means may involve surveys (written and telephone), selective interviews, etc.	Strategic Advisor II for Community Preparedness	Apr 07	0	Existing Budget
ESF-5	Activation of the EOC needs to be more proactive (instead of waiting for anticipated conditions to develop), and demobilized only after conditions warrant.	The OEM Director has already committed to more frequent activations of the EOC.	OEM Director	Completed in Jan 07	N/A	N/A
ESF-5	Sections of the EOC Call-out List,	Update EOC Call-out List to make	Strategic Advisor 2 for Ops and Plans,	Mar 07	0	Existing Budget

	particularly the information that relates to contact numbers for Department Duty Officers and Operating Centers needs to be updated.	adjustments for the new ESF numbers, and to update the information contained in Appendix 2 (DOC List).	IT Professional B, and Adm Spcl 2			

HUMAN SERVICES
(ESF-6)

Overall Assessment

It takes time to activate and prepare shelters. Before any decision can be made it requires accurate information to answer the following questions:

1. What specific communities are experiencing the consequences of a threat that will require them to seek safety at a shelter?
2. What types of special needs populations will need to be accommodated?
3. How many people will be seeking shelter?
4. What is the best estimate of how long shelters could be required?

Information on the extent of outages and their potential duration was limited. The ESF-6 Coordinator called the City Light System Control Center (SCC) to get a sense of the answers to the above questions. At times the SCC did not have clear information, which complicated the decision-making on where to set up shelters, as well as decisions on how best to staff and maintain shelters.

Practices that Worked Well:

- The use of Community Centers and the ability of the Parks Department to quickly implement procedures established in the ESF-6 Annex to activate and staff shelters. The table below is a recap of shelter occupancies from December 15-21, 2006:

Shelter Site	*Fri 12/15*	*Sat 12/16*	*Sun 12/17*	*Mon 12/18*	*Tues 12/19*	*Wed 12/20*	*Thurs 12/21*
Bitter Lake	0	18	12	4	3	Closed	Closed
Delridge	12	24	17	1	8	Closed	Closed
Southwest	Not Open	19	15	0	Closed	Closed	Closed
Rainier	Not Open	17	15	24	22	13	10
Total Use/Night	12	78	59	29	33	13	10
Total Served							224

- The assistance received from the Fire Department in passing out leaflets to inform residents where they could seek shelter. Also, the conduct of “welfare checks” for persons with special health issues, e.g., people requiring electrically powered life-support systems, such as ventilators and respirators, etc.

- Assistance from SPD in using "emphasis patrols" to help homeless people find shelter.

Lessons Learned

- ESF-6 needs to further develop and maintain a current list of contacts and 24-hour numbers from support organizations and care centers to readily engage their assistance in providing human services, or to determine the status of these agencies in being able to support the level of services required by their clients. An example of the types of inquiries that were attempted involved such agencies as the Seattle Housing Authority to determine what they were doing about their senior high-rise that was without power.
- There is no staff dedicated exclusively to ESF-6 operations. The ESF-6 Coordinator and Parks Department counterpart worked well together in this event, as they have previously when there is a need to activate only a few shelters and for a relatively short period of time. However, existing capabilities would be taxed in any event that required the sheltering of more than 100 people and the activation of more than a few shelters. There is also concern that the Red Cross support available to the City would be limited in any large-scale event, especially one that is regional in scope. In anticipation of this real probability, it would be prudent to train more City personnel to support such an eventuality, and to similarly work with other organizations (such as churches) to see if a broader network and capacity could be made available.
- Additional WebEOC training is needed to deepen the network of ESF-6 City staff that could be assigned to the EOC.
- Some of the City community centers get their heat from boilers located in adjacent Seattle Public School (SPS) facilities. This became a problem during the contemplated response at the Rainier Beach Community Center, where the City wanted to establish a shelter but discovered there was no heat. The current practice by SPS is for the school custodians to shut down the boilers once they leave for the day, apparently as a cost saving measure. The Parks Department believes they can benefit from a memo of understanding with the SPS that would allow engineers from the Parks Department access to the boilers in cold weather, i.e., whenever a shelter is activated and the school day has ended.
- The Parks Department needs to be able to find additional personnel to act as shelter managers and staffers. These people will also require the necessary training to perform respective job assignments, and to handle special needs populations. This would be critical in any long-term situation where there would be many shelters opened for an extended period of time, either by an event affecting Seattle or because of an event elsewhere (such as an eruption of Mt. Rainier) in which the City could be asked to house evacuees. While the City has recently deployed four caches of shelters supplies, this would accommodate only a limited and short-term activation of shelters.
    - ESF-6 set the groundwork in 2006 by significantly expanding the proposed scope of sheltering, food and human service response to

more realistically prepare for a major event such as an earthquake. ESF-6 shelter and related goals assumes as much as ten percent of Seattle's population will need shelter and related support in the case of a major disaster. A new sectional shelter response was introduced in the revised ESF-6 plan.

- ESF-6, as part of this year's work plan, will broaden its partnerships with more community service organizations to increase its overall capabilities and establish a more unified approach to delivering the full range of human services citywide in a disaster, especially the more challenging larger-scale events.
- ESF-6 needs a database that identifies the vulnerable populations throughout the city and to determine their specific requirements so that ESF-6 can better match vulnerabilities to available services.
- Simple clear phone numbers for the community to get information and report problems was a challenge. 2-1-1 was initially given as the call-in number, but it did not have the capacity to handle the initial call volume, nor was it in operation 24/7, and was not yet staffed in Pierce County and not operational at all in Thurston County. This caused a great deal of confusion, especially in Pierce and Thurston County, and drew attention from the media. In the City, the SPU Call Center, out of necessity, was resorted to as the only available and viable choice.
- Responding to individual calls for case management-related assistance is a challenge. While there is support for persons in the system, such as mental health and aging case management, there is no readily available resource for individuals not connected with these existing systems.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	Cost	Funding Source
ESF6	Deeper call out list required	Three deep referrals identified for key partners	Alan Painter	3/31/07	N/A	N/A
ESF6	Full time staff dedicated to ESF 6 functions necessary to meet shelter, human service and community outreach goals	Hire 1.0 FTE in HSD to lead City human service disaster mgmt response and coordinate with Parks for planning effort to assist shelter and food plan development and linkages	Alan Painter/Christopher Williams	Ongoing	$70,000 (estimate)	HSD carryover fund balance and General Funds
ESF6	Training of City of Seattle staff in shelter management by Red Cross	Develop training plan and identify potential staff for training	Office of Emergency Management	Training plan by 10/07.	TBD	
ESF6	Further train ESF6 partners in WEB EOC.	Identify staff to train and then train at EOC. Also ensure compliance with NIMS training	Alan Painter	12/31/07 and ongoing		
ESF6	MOA between Parks and School District	Formal agreement between Parks and School District re	Christopher Williams	12/31/07	TBD	

		shelter support				
ESF6	Develop nonprofit capacity to respond to emergencies	Training nonprofits re emergency preparedness and continuity of operations	HSD, Health and United Way. Alan Painter HSD lead.	12/31/07 and ongoing	$52,000 in 07 HSD budget	In 07 budget, likely ongoing cost
ESF6	Develop vulnerable populations database	Identify community agency and key community leaders in different elements of vulnerable populations	DON, HSD, Parks, Health, United Way of King County	12/31/07 and ongoing		
ESF6	Identify case management related support for disaster victims	Initiate community discussion with nonprofit community, possibly leading to RFQ	Alan Painter	12/31/07 and ongoing	TBD	

PUBLIC HEALTH – SEATTLE & KING COUNTY (ESF-8)

Overall Assessment

The response to the windstorm was by far the largest and longest activation Public Health – Seattle & King County has ever carried out. We and our partners were presented with storm consequences never before encountered in this region. In the face of this disaster, Public Health staff stepped into the response effort with innovation, commitment, and professionalism.

Practices that Worked Well

Public Health – Seattle & King County activated at an unprecedented response level within recent history.

- Several untested plans were implemented.
    - Outreach to vulnerable populations: Preparedness, Community Based Public Health, Environmental Health, Communications and other Public Health sections joined forces to inform citizens using varied and multiple strategies.
    - Special Needs Shelter (SNS): Community Health Services (CHS) and Administrative support staff ran a top-notch facility with little time to prepare; Environmental Health provided onsite safety oversight.
    - Resource Management: Public Health and King County Health Care Coalition (KCHCC) staff within the Public Health Emergency Operations Center (PH EOC) operated the Regional Medical Resource Center (RMRC) to find resources for nursing homes and assisted living facilities to help their residents shelter in place; resources included medical and no-medical needs.
- The Communications team skillfully and adeptly handled more media inquiries about this event than any other ever experienced.
- Communicable Disease staff worked to establish a continuing investigation into storm-related illness (Carbon Monoxide Poisoning, Toxic Asphyxia, Food Borne Illness).
- The PH EOC and KCHCC expanded system monitoring from hospital ambulatory care to include skilled nursing facilities and boarding homes for the first time.
- Community Health Services and Environmental Health staff worked diligently to serve their communities despite rolling outages at multiple Public Health sites.
- The Environmental Health team worked diligently to reduce the risk of food borne illness in restaurants.
- The PH EOC was activated for the entire event (December 15 – 22), offering coordination, administrative and logistical support to our operations.
- The Department implemented business continuity plans to maintain critical services while staffing emergency operations facilities.

Lessons Learned

- Strengthen Health Care Coalition (HCC) Structure and Practices.
  - Improve intelligence gathering and communication with hospitals and other Healthcare Coalition members so they know the Coalition is there to provide situational updates and resource support.
  - Coordinate with the hospitals on making necessary changes to the implementation to the Central Region Emergency Department Saturation Policy.
  - Improve the development and distribution of situation updates to all healthcare members and partners.
- Design Alternate Care Facility Model Based Upon this Experience.
  - Improve linkages and communications between Public Health EOC and Alternate Site(s).
  - Improve communications with response partners for coordination of purpose, outreach and transfer to shelter.
  - Improve security protocols: screening for safety, weapons training, having adequately trained safety officer(s) beyond Environmental Health to physical security.
- Define Roles and Responsibilities of Agencies in the Social and Human Services Network.
  - Develop a plan to address the gap between Public Health and Crisis Clinic/2-1-1 capabilities.
  - Improve information available on Public Health Information Line; clarify where to get and who hosts specific data and responsibility (i.e. American Red Cross - shelters, 2-1-1 Community Information Line – social services).
  - Strengthen relationships with DSHS, King County Department of Community and Human Services, City of Seattle Department of Aging and Disability Services and others to build an emergency response safety-network for vulnerable individuals who may or may not have a case manager in an existing support system.
- Build Depth in Vulnerable Population Outreach and Response.
  - Add more depth to the communication network; add after hours contact information to key contact lists as well as ethnic media outlet listings.
  - Capture the Public Health internal outreach capacity – work with staff who have contacts in their program areas.
  - Improve intelligence-gathering capability about affected communities and neighborhoods.
- Improve Materials Development and Translation.
  - Improve rapid translation capability – need more contractors identified, and internal second review of materials.
  - Develop shorter, more visual messages on food safety and carbon monoxide hazards.

- Phrase message positively: tell people what to do, not what to not do – e.g., how to heat their homes as opposed to how not to heat their homes.

- Improve Vaccine Storage Back-Up System.
  - Develop Memorandums of Understanding (MOU) regarding safety and back-up generators.
  - Develop mechanism to issue a new health order during an event – all shifts at hospitals and clinics did not receive the message.
- Improve Administrative Systems.
  - Strengthen Workforce Call-Out procedures:
    - ✓ Develop plans to call up staff for activation over the weekend.
    - ✓ Improve emergency contact lists and rotate shifts of admin staff.
    - ✓ Reassess staff deployment procedures and communication on internal staffing needs, e.g. non-clinical staff thought they weren't needed.
    - ✓ Develop employee messaging for emergency activation.
  - Response required significant staffing and overtime off budget – develop a mechanism to track it and not penalize divisions for budget overages.
  - Develop job card to clarify Admin Lead Position.
  - Develop information sheets to clarify and summarize labor contract language regarding timekeeping and emergency deployment policies and procedures.
  - Clarify the staff needs prior to making callouts; improve communication between field response, PH EOC and workforce activation.
- Improve Logistics System.
  - Improve field computer and cell phone availability and connectivity.
  - Strengthen connection with Public Health EOC and KC ECC.
  - Improve logistics staffing depth.
  - Develop real time inventory tracking in field setting.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for Public Health

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-8	Build Depth in Vulnerable Population Outreach and Response	▪ Add more depth to the communication network ▪ Add after hours contact information to key contact lists as well as ethnic media outlet listings ▪ Capture the Public Health internal outreach capacity – work with staff who have contacts in their program areas ▪ Improve information gathering capability about affected communities and neighborhoods	Public Health Vulnerable Populations Action Team (VPAT) Steering Team	Ongoing through 12/07 These are ongoing efforts that will need continued planning and support beyond 2007.	$100,000	Local (King County Executive)
	Improve	▪ Improve rapid translation	Public Health	Ongoing	See above.	See above.

ESF-8	Materials Development and Translation	capability – need more contractors identified, and internal second review of materials ▪ Improve rapid translation capability – need more contractors identified, and internal second review of materials Phrase message positively: tell people what to do, not what to not do – e.g., how to heat their homes as opposed to how not to heat their homes	Communications Team and VPAT Steering team	through 12/07 These are ongoing efforts that will need continued planning and support beyond 2007.		
ESF-8	Define of Roles and Responsibilities of Agencies in the Social and Human Services Network	▪ Develop a plan to address the gap between Public Health and Crisis Clinic/211 capabilities ▪ Improve information available on Public Health Information Line; clarify where to get and who hosts specific data and responsibility (i.e. American Red Cross - shelters, 211 Community Information Line – social services) ▪ Strengthen relationships with DSHS, King County Department of Community and Human Services, City of	Public Health VPAT Steering team	Ongoing through 12/07 These are ongoing efforts that will need continued planning and support beyond 2007.	See above.	See above.

		Seattle Department of Aging and Disability Services and others to build a emergency response safety-network for vulnerable individuals who may or may not have a case manager in an existing support system				
ESF-8	Strengthen Health Care Coalition (HCC) Structure and Practices	▪ Improve information gathering and communication with healthcare organizations, hospitals and other Healthcare Coalition members so they know the Coalition is there to provide situational updates and resource support ▪ Coordinate with the hospitals on making necessary changes to the implementation to the Central Region Emergency Department Saturation Policy.	Healthcare Coalition Coordinating Group	Ongoing through 12/07 These are ongoing efforts that will need continued planning and support beyond 2007.	$300,000	Local (King County Executive), State (UASI), Federal (HRSA)

SEATTLE CITY LIGHT
(ESF-12)

Overall Assessment

Given this extraordinary event, Seattle City Light employees performed well under arduous and difficult conditions. City Light suffered its most extensive outages in the utility's history, with more than 49 percent of customers losing power. Despite having to contend with such extreme circumstances, by December 17 (the third day) at 11 p.m., 95 percent of the system was restored.

Practices that Worked Well

- At the peak of demand, City Light mobilized 40 line and service crews and 10 private tree crews to begin restoration work as soon as conditions allowed. Three hundred City Light employees worked around the clock in addition to 104 contract and mutual aid workers.
- Since October, emergency preparedness messages had been sent to educate the public.
- City Light had employees on the streets of neighborhoods where power was out, leafleting door-to-door to communicate information to customers. This effort started early Saturday morning, the day after the storm.
- All Code 1 registered customers on medical support were contacted on Saturday and again on Thursday to ensure they were safe and OK. Home visits were made to those not reached by telephone.
- Throughout this event, City Light experienced only one minor injury.

Lessons Learned

- Multiple methods of communication with the public must be incorporated into response and recovery operations.
- Adequate tree trimming and preventative maintenance of power lines and equipment can lessen impacts of severe windstorms. SCL needs to acquire adequate resources to catch up to a four-year replacement cycle.
- Evaluate whether the Power Restoration Plan ought to be revised to provide clearer guidance on the protocols for the deployment of essential line workers and supervisors, including addressing housing, transportation and communications needs that might be compromised during a major emergency or sudden disaster. Discussions in the utility to address this issue should be aimed at improving the timeliness of the overall restoration effort while balancing the safety of the workers.
- SCL should review and confirm existing contracts and Mutual Aid Agreements.
- SCL needs to have better information about the condition of assets and work to replace infrastructure and equipment before they fail.

- New technologies may offer outage information in real-time, such as the Automated Meter Reading program which could improve restoration efforts. SCL currently has an Automated Meter Reading system demonstration program in High Point and South Lake Union and will use the information from this experience to evaluate expanding this program.
- SCL needs to pursue full implementation of the NIMS model by which events are better coordinated and managed.
- SCL needs to train management staff to use WebEOC for reporting to the EOC and communicating with other City DOCs.
- SCL needs to establish a permanent SCL DOC that can be rapidly mobilized, and that can be staffed with a sufficient number of senior managers who are trained to operate in a DOC environment.
- SCL needs to develop and implement an Outage Management System that can enable them to better identify specific areas of outage, and be able to inform customers when they can expect to see their power restored.
- Conduct joint review of key customers' emergency response plans in order to identify respective interdependencies, state of preparedness and response expectations.
- Review current Code 1 program that allows customers on medical support systems to be placed on a higher priority level of restoration, and specifically be more proactive in SCL's outreach efforts to ensure the list is as complete and current as possible.

Independent After Action Study

To ensure SCL adequately identifies all of the problem areas that surfaced during the windstorm and to find the most effective solutions, SCL has taken the initiative of using an independent consulting firm to conduct a full review of its response and restoration efforts.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for Energy

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-12	Communications With public and employees	Implement customer and employee notification system	SCL Communications and Public Affairs	6/30/07	TBD	Internal
ESF-12	Tree trimming and preventive maintenance program	Review vegetation management program and establish a preventive maintenance program	SCL Customer Services and Energy Delivery Business Unit	TBD	TBD	Internal
ESF-12	Providing lodging facilities for critical workers during disaster	Review, update and add new lodging contracts	SCL Customer Services and Energy Delivery Business Unit	4/30/07	N/A	N/A
ESF-12	Contracts and Mutual Aid Agreements	Review and update contracts and mutual aid agreements	SCL Customer Services and Energy Delivery Business Unit	Completed	N/A	N/A
ESF-12	Asset Management	Assessment of current utility infrastructure and equipment condition for replacement or repair	SCL Customer Services and Energy Delivery Business Unit	In Progress	TBD	Internal

ESF-12	NIMS implementation	Conduct drills and exercises using NIMS and establish Incident Management Team	SCL Division of Security and Emergency Management	3/30/07	$39,000	Internal
ESF-12	Utilization of WebEOC program	Train operations and key personnel on the use of WebEOC and begin use of program and DOC and system control center	SCL Division of Security and Emergency Management	6/30/07	N/A	N/A
ESF-12	Department Operations Center	Establish a permanent Department Operations Center	SCL Division of Security and Emergency Management	12/31/07	TBD	Internal Grants
ESF-12	Outage Management System	Develop and implement an Outage Management System	SCL Division of Security and Emergency Management		TBD	Internal
ESF-12	Identification of key customer's interdependencies, state of preparedness and response expectations	Conduct joint review of key customer's emergency plans	SCL Account Executive Office	4/30/07	N/A	N/A
ESF-12	Identification of customers on medical support systems	Review and enhance current Code 1 program	SCL Customer Services and Energy Delivery Business Unit	Completed	N/A	N/A
ESF-12	Assessment of department's response efforts	Conduct an internal and external After Action Review to ensure SCL	SCL Customer Services and Energy Delivery Business Unit	4/30/07 (Target Date)	(Need contract $ amount with CH2M Hill)	Internal

		adequately identifies all of the problem areas that surfaced during the windstorm and to find the most effective solutions.				

SEATTLE POLICE DEPARTMENT
(ESF-13)

Overall Assessment

Individually, each department put forth significant effort within its area of responsibility. Improvements could be made in how agencies coordinated with one another and in how we unified our efforts.

Practices that Worked Well

The SCL automated map showing the electrical system status was very helpful.
The liaison from SPD to SDOT helped SPD and SDOT.

Problems Encountered

- The pre-event planning could have been more comprehensive. The coordination between departments regarding policy decisions was not adequate. Issues arose such as signage, traffic control, and others that should have been agreed upon in advance rather than during an emergency.
- Not all DOCs had adequate people to answer phone calls from other DOCs. This could cause delays in providing more seamless coordination between departments. A more coordinated approach would have sped the recovery from this storm. See below.
- The vast majority of callers to 9-1-1 (whether they were transferred to SFD, another PSAP, or handled in-house) were reporting conditions or situations that were not appropriate for Fire or Police emergency response. We need another place to route these callers to free up the 9-1-1 trunks for true emergencies.
- Each call to 9-1-1 holds the line open until we finish the transfer or get the caller back off "hold." Abandoned calls (people who dial 9-1-1 and hang up) also hold the line until we get back to them. Quest saved our system from more significant problems by remotely resetting "locked PBXs" feeding Seattle Police and Fire, King County Sheriff, Eastside Communications and ValleyCom. SPD Communications is working with King County 9-1-1 to fix these problems. However, surge capacity will always be a problem because there will never be enough phone lines or call takers to meet public demands during a crisis.
- The media messaging should be coordinated with KC E911, but there are several system critical messages/actions that need to get out before people lose power or phone service. For instance: “Only call 9-1-1 for emergencies that may require Fire, Aid or Police response. When you dial 9-1-1 continue to stay on the line during pauses, calls are answered in the order received”.
- Provide alternate 10-digit number(s) for other calls (and up staff those call centers).

Lessons Learned

- A more organized approach to the multi-departmental damage assessment process is necessary. In cooperation with SCL, SDOT, SPU, and SFD, develop an integrated and flexible plan that applies to multiple emergencies.
- WebEOC should be used by all agencies during a disaster to correct coordination deficiencies.
- Consider a “Task Force” approach that would combine first responders from all those departments deploying units to emergency site locales into teams to respond more quickly to downed tree issues. In that way teams can maximize their efforts and expertise to manage the multiple issues that are necessary in such a response (traffic control, street flooding, electrical, and tree removal).
- Consider a mechanism to improve our damage assessment capability. While much of the damage is called in by citizens, we could consider establishing a mechanism to conduct windshield survey assessments in areas with the greatest power loss, or flooding, or etc., as an SOP.
- Create a more significant role for SFD. They have chain saws, pumps, etc., that could assist SDOT and others in clearing roads.
- Early concern that some citizens had about leaving their homes out of fear they would be victimized by residential burglaries by persons trying to take advantage of the situation did not materialize. It is believed that the emphasis patrols that were employed helped to alleviate any problem in this regard as there were only 11 more residential burglaries citywide than the week before.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for SPD

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-13	More organized damage assessment	Develop City damage assessment reporting procedure	DMC/EOC Staff	May 07	None	N/A
ESF-13	Improve SPD support to utilities at incidents	Research and develop Task Force procedure	Sgt. Tietje/SPU/SCL	Fall 07	None	N/A
ESF-13	Better City comprehensive pre-event planning	In coordination with EOC develop checklist for pre-event plans based on specific incidents	DOC/EOC	Fall 07	None	N/A
ESF-13	Enhance coordination between DOC	Research enhancements to WebEOC	SPD/EOC/DMC	June 07	None	N/A

EXTERNAL AFFAIRS
(ESF-15)

Overall Assessment

The storm struck the city with much more strength than was anticipated, knocking power out to half of Seattle City Light customer accounts. ESF-15 coordinated the storm-related public information function per the "multiple departments" provision in its Annex:

> Multiple departments – This type of emergency involves more than one department, e.g., a rainstorm that causes electrical power outages in some parts of the city and water-related problems in others could involve City Light, SPU and SDOT. The PIOs apprise the ESF-15 Coordinator/Mayor's Communications Director and Press Secretary of, and about, the incident that has required response from multiple departments. The ESF-15 Coordinator/Mayor's Communications Director and Press Secretary coordinate the City's response from the Mayor's Office, working with the departments' PIOs.

Practices that Worked Well

In the aftermath of the storm, departments such as SPU, SCL, SDOT, DPD and Parks worked with the Emergency Public Information Coordinator and the Mayor's Office to send out important safety information. Via news releases, the City Web site and media, the City directed people on where to seek shelter, to stay away from downed power lines, to not burn fires indoors to avoid CO poisoning, etc.

Lessons Learned

The magnitude of the storm made it more difficult for certain departments to respond to public information requests. Physically co-locating participating department PIOs at the EOC would have helped City Light deal with demands placed on its staff. The external affairs response to the next storm of such a magnitude should be coordinated via a JIC at the EOC.

The following actions should take place in the future for any forecasted event that matches the scale of this incident or results in greater damage:

- Distribute important safety information to the media before the storm hits so people know what to do beforehand.
- Physically centralize public information efforts by activating the City's JIC at the EOC.

- In addition to using traditional “outgoing” information channels (local media, Web, etc.), work closely with the appropriate ESFs, such as Human Services, to ensure vulnerable populations receive emergency information, such as the availability and locations of shelters, transportation to shelters, etc. If any of this has been determined before the storm, publicize beforehand.
- Work with key leaders in the immigrant and refugee communities to help ensure emergency messages reach Seattle’s residents with limited proficiency in English.
- Use the storm as a tool to promote personal preparedness and the importance of not being able to rely on government services for extended periods of time. The big earthquake will make this storm look like a very minor inconvenience.

DECEMBER 14, 2006 WINDSTORM IMPROVEMENT PLAN for Public Information

EMERGENCY SUPPORT FUNCTION	PROBLEM DESCRIPTION	KEY ACTION STEP(S) THAT WILL LEAD TO RESOLUTION OF THE PROBLEM	INDIVIDUAL RESPONSIBLE FOR COMPLETING THE ACTION STEP	EXPECTED DATE OF COMPLETION	ESTIMATED COST	FUNDING SOURCE
ESF-15	Distribute important safety information before	Collect all safety tips distributed during and after storm events and add to PIO pre event information file in EOC	Emergency PIO Coordinator will com pile and add information to the EOC PIO File for future pre-messaging efforts.	February 28	NC	NA
ESF-15	Department functions not centralized during storm event	Recommend that EOC be activated prior to expected storm so information can be centralized	Emergency PIO Coordinator or other PIO can suggest change. Can include this into the new ESF Annex	Ongoing	NC	NA
ESF-15	Successfully getting information into the hands of vulnerable populations beforehand	Develop protocol with Human services, health, church organizations, etc. to reach out to vulnerable populations before disaster strikes.	Emergency PIO Coordinator. Develop a protocol on who to contact and work with to achieve success in reaching these populations	May 25	NC	NA
ESF-15	Immigrant and refugee	Work to establish key immigrant and	Emergency PIO Coordinator with help	June 22	NC	NA

	population were not reached during storm outreach efforts	refugee community contacts who can help city to distribute safety tips and other information	for DON and other city departments			
ESF-15	Getting the public to take personal preparedness seriously	Use the time following the storm to message the importance of being personally prepared. Working closely with the OEM education staff to coordinate opportunities to tout the importance of personal preparedness.	Cornell Amaya used the recent launch of the new OEM web site to tie into the recent storms to make a connection with the importance to get prepared. Also was able to tie storm events into a release announcing SNAP program class schedules	completed	NC	NA